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work have been carried on in all of these clinics. Nurses especially trained and adapted for this work are badly needed.

Five commissioned officers, 44 acting assistant surgeons, and 3 scientific assistants have been detailed to the various States as State venereal disease control officers. Forty acting assistant surgeons have been on duty in the United States Government clinics located in extra-cantonment zones.

A large part of the division's work is educational. The work of preparing materials, establishing contacts, and developing methods in educational work has been almost finished during the month. Several new pamphlets have been published. Two exhibits, one for the general public and one for young men and boys, are ready for the printers. Educational material has been mailed to libraries, newspapers, and industrial organizations. Conferences for educators and lecture tours have been scheduled. Educational campaigns are being arranged in the respective States, and the demand for educational pamphlets is increasing.

During the period of reconstruction, the task of venereal-disease control will not be lessened, but will rather be broadened and intensified. The entire area of the United States must be covered through a thoroughgoing cooperative campaign in which all agencies—National, State, and local—can play an important part.

EXPERIMENTAL MAMMALIAN POLYNEURITIS PRODUCED BY A DEFICIENT DIET.

By CARL VOEGTLIN and G. C. LAKE, Hygienic Laboratory, United States Public Health Service.

Progress in the study of diseases of dietary origin has been greatly aided by animal experimentation. This is true of the group of so-called deficiency diseases, of which beriberi is the best known example, as well as in the other fields of medical research. Thus it can not be questioned that Eijkman's discovery that polyneuritis in fowls could be induced by an exclusive diet of polished rice has very materially contributed to our present conception of the etiology of beriberi and its prevention.

The study of deficiency polyneuritis is also intimately connected with the more recent development of the physiological aspects of nutrition, inasmuch as it has been shown that beriberi is due to a deficiency of the diet in a definite substance (antineuritic vitamine), which is essential for normal nutrition. From this standpoint the study of beriberi in animals will undoubtedly shed some light on the physiological function of the antineuritic vitamine. All we know at the present time regarding this function is that a certain minimal amount of this substance must be present in the diet in order to

permit normal growth of the young and the maintenance of weight and health of the adult animal and man.

On the bases of these considerations an attempt was made to produce polyneuritis in the ordinary laboratory animals. This work then led to a study of the nutritive value of meat influenced by exposure to higher temperatures, including those ordinarily used in cooking and canning. This last-mentioned subject is obviously of considerable practical importance.

The detailed report of this investigation will be published in the *American Journal of Physiology* for January, 1919. The principal results obtained are as follows:

I. Polyneuritis has been produced in cats and dogs as the result of an exclusive dietary of lean beef which was heated for three hours at 120° C. in the presence of alkali (sodium carbonate). Proof of this statement is furnished by the symptomatology, treatment, and pathology of the disease noted, which are essentially those characteristic of beriberi.

(1) *Symptoms*.—The following symptoms were observed in these animals: Diminution of appetite, constipation, loss of body weight, weakness and sometimes drowsiness, followed by paralytic symptoms, tonic convulsions, spasticity of certain groups of muscles, and disturbances of the circulation and respiration.

(2) *Treatment*.—The oral administration of active preparations of the antineuritic substance of yeast to paralyzed animals is followed promptly by the disappearance of the symptoms, and the continued administration of these preparations prevents the recurrence of the disease.

(3) *Pathological changes*.—Certain histopathological changes, especially the changes involving the nervous system, are described. Animals showing severe paralysis exhibit no qualitative changes in the reaction of various nerves to electric stimulation.

II. The disease is due to a deficiency of the diet in antineuritic substance, and not to a deficiency in the other essential dietary components (amino acids, fat-soluble vitamins, etc.).

III. Exposure of the beef for three hours to a temperature of 120° C., without the previous addition of alkali, does not completely destroy the antineuritic power of this food. It is, therefore, concluded that the ordinary preparation of meat for human consumption does not lessen its food value in this respect.

IV. The various species of animals show a considerable difference in their susceptibility to polyneuritis, as evidenced by the different length of time which is necessary to induce the disease by the same deficient diet. Cats respond to the deficient diet with the greatest regularity and are, therefore, best adapted for physiological studies of the function of the antineuritic substance.